



General information	
Academic subject	Animal Physiology
Degree course	Bachelor's Degree in Natural Sciences
Academic Year	II
European Credit Transfer and Accumulation System (ECTS)	6
Language	Italian
Academic calendar (starting and ending date)	March 7, 2022 - June 17, 2022
Attendance	Yes

Professor/ Lecturer	
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Virtual headquarters	Microsoft Teams
Tutoring (time and day)	Students will be received by appointment, directly agreed with the teacher by phone or by email.

Syllabus	
Learning Objectives	The course aims to provide students with the fundamental functional principles of living matter through the analysis of functions both at the cellular level and at the animal organism level.
Course prerequisites	Cytology, Histology, Comparative Anatomy, General, Inorganic and Organic Chemistry, Physics, General and Systematic Zoology
Contents	<p>Frontal lessons:</p> <p>Organization levels of living organisms</p> <p>Structure and functions of the plasma membrane. Biophysics of the diffusion of molecules across membranes, osmosis and transport mechanisms. Pumps and ion channels.</p> <p>Electrochemical potentials and resting membrane potential. Graded potential. The properties of excitable cells: genesis and conduction of the action potential.</p> <p>Nerve cell physiology and general organization of the nervous system. The chemical and electrical synaptic transmission. Neurotransmitters and receptors.</p> <p>The neuromuscular junction. Sensory input: characteristics of sensory receptors and transduction mechanisms related to the main sensory modalities.</p> <p>The skeletal muscle. Molecular basis of contraction and excitation-contraction coupling. Mechanics of contraction. Muscle metabolism. Notes on the structure and functions of smooth muscle.</p> <p>Endocrine signaling: hormones and functional coordination. Dark-light seasonal and circadian regulation of hormone secretion. Biological rhythms. Exocrine glands</p>



	<p>of animals. Pheromones.</p> <p>Laboratories (to be defined according to the research activities in progress)</p> <p>Preparation of the main physiological buffers; Cell cultures Extraction and quantification of proteins from cellular samples; Protein analysis by microscopy techniques (Epifluorescence and/ or Confocal microscopy) Measurements of cell function: growth, cytotoxicity, migration</p>
Books and bibliography	"Fisiologia Animale" di Poli et al., 2014 – Casa Editrice EdiSes, Napoli.
Additional materials	Lessons will be provided in ppt; Examples of websites

Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
Hours			
150	40	15	95
ECTS			
6	5	1	
Teaching strategy			
Lectures with the use of PowerPoint and single-seat laboratory exercises carried out in the laboratory.			
Expected learning outcomes			
Knowledge and understanding on:	<p>The basic mechanisms of the main physiological processes; The fundamentals of molecular and cellular physiology; The basic methods for the evaluation of physiological parameters and markers of cellular fractions; The link between structure and function at different levels of the organization of living matter from molecules to the integrated system; The study of systems and apparatuses, starting from the mechanisms by which the different cell types perform their function up to the regulation of the activity of the various tissues and organs.</p>		
Applying knowledge and understanding on:	<p>The student will learn the regulatory mechanisms allowing the different systems to work in a coordinated manner within the organism, maintaining its state in health. The theoretical and practical activities are aimed to make the student familiar with the experimental procedures and the use of instruments typical of a physiology laboratory. The skills acquired will make it possible for the student to have an adequate understanding of international publications on Animal Physiology, an understanding of a laboratory protocol and its implementation</p>		
Soft skills	<ul style="list-style-type: none"> <i>Making informed judgments and choices</i> The student will acquire the ability to find the solution of a simple computation problem using an autonomous logical procedure. Further, he/she will acquire critical tools to creatively generate new hypotheses to achieve the set goal. <i>Communicating knowledge and understanding</i> The student will have to acquire a correct language to argue complex problems in a precise, concise and clear way. In particular, he / she will 		



	<p>acquire the ability to exhibit with the same characteristics highlighted above the topics concerning the needs of organisms in response to environmental parameters. The student will be invited to discuss about the topics learned during the lessons</p> <ul style="list-style-type: none">• <i>Capacities to continue learning</i> <p>The student will acquire the ability to understand the relationships between form and function and their dependence on the environment. The student must be able to update the informations acquired and acquire the ability to investigate environmental issues.</p>
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Assessment and feedback	
Methods of assessment	Oral examination
Evaluation criteria	<p><i>Knowledge and understanding</i></p> <p>The student must demonstrate knowledge of all the teaching contents. They should also be able to make links between the various topics that make up the teaching program. Knowledge of the notions alone is not considered sufficient.</p> <p><i>Applying knowledge and understanding</i></p> <p>The ability to apply knowledge and understanding will be verified by solving simple problems posed extemporaneously</p> <p><i>Autonomy of judgment</i></p> <p>During the exam, the student must be able to independently develop possible links with other disciplines of its course of study on topics proposed by the members of the examination board. This ability will lead to a very positive evaluation of the exam</p> <p><i>Communicating knowledge and understanding</i></p> <p>Effectiveness and clarity in the presentation of the topics, logical connection and adequate terminology will be highly regarded.</p> <p><i>Communication skills</i></p> <p>The ability to express concepts and formulate interpretations with properties of language and clarity of presentation will be very positively evaluated. The student must also demonstrate the ability to apply the acquired knowledge in informative or didactic contexts.</p> <p><i>Capacities to continue learning</i></p> <p>The student must demonstrate that he/she has been able to independently acquire further knowledge on the basis of an interdisciplinary preparation. This demonstration will be recognized by increasing the final grade up to the maximum grade</p>
Criteria for assessment and attribution of the final mark	<p>The evaluation is expressed out of thirty.</p> <p>The assiduous and active participation during the teaching course will be appreciated. For the final grade, the ability to connect the contents of different knowledge, clarity and precision of presentation, the property of language, the ability to reproduce graphs of the functions studied are taken into consideration.</p>



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Additional information	None